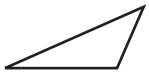
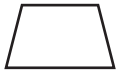
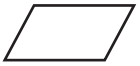
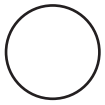
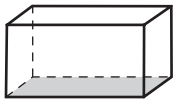
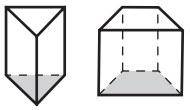
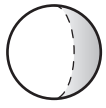
ISTEP+ Grades 9 and 10 Mathematics Reference Sheet

Shape	Formulas for Area (A) and Circumference (C)
Triangle 	$A = \frac{1}{2}bh = \frac{1}{2} \times$ base $\times$ height
Rectangle	$A = lw$ = length $\times$ width
Trapezoid 	$A = \frac{1}{2}(b_1 + b_2) \times h = \frac{1}{2} \times$ sum of bases $\times$ height
Parallelogram 	$A = bh$ = base $\times$ height
Square	$A = s^2$ = side $\times$ side
Circle 	$A = \pi r^2 = \pi \times$ square of radius $C = 2\pi r = 2 \times \pi \times$ radius $\pi \approx 3.14$ or $\frac{22}{7}$
Figure	**Formulas for Volume (V) and Surface Area (SA)**
Rectangular Prism 	$V = lwh$ = length $\times$ width $\times$ height $SA = 2lw + 2hw + 2lh$ = 2(length $\times$ width) + 2(height $\times$ width) + 2(length $\times$ height)
General Prisms 	$V = Bh$ = area of base $\times$ height SA = sum of the areas of the faces
Cylinder	$V = \pi r^2 h = \pi \times$ square of radius $\times$ height $SA = 2\pi r^2 + 2\pi rh$ = 2 $\times$ π $\times$ square of radius + 2 $\times$ π $\times$ radius $\times$ height
Sphere 	$V = \frac{4}{3}\pi r^3 = \frac{4}{3} \times \pi \times$ cube of radius $SA = 4\pi r^2 = 4 \times \pi \times$ square of radius
Right Circular Cone	$V = \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \pi \times$ square of radius $\times$ height
Regular Pyramid	$V = \frac{1}{3}Bh = \frac{1}{3} \times$ area of base $\times$ height

$\pi \approx 3.14$ or $\pi \approx \frac{22}{7}$

Equation of a Line

Slope-Intercept Form:

$y = mx + b$

where m = slope and $b = y$-intercept

Point-Slope Form:

$y - y_1 = m(x - x_1)$

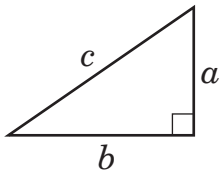
where m = slope and (x_1, y_1) is a point on a line

Slope of a Line

Let (x_1, y_1) and (x_2, y_2) be two points in the plane.

$$\text{slope} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1} \text{ where } x_2 \neq x_1$$

Pythagorean Theorem



$$a^2 + b^2 = c^2$$

Distance Formula

$$d = rt$$

where d = distance, r = rate, and t = time

Temperature Formulas

$$°C = \frac{5}{9}(F - 32)$$

$$°\text{Celsius} = \frac{5}{9} \times (°\text{Fahrenheit} - 32)$$

$$°F = \frac{9}{5}C + 32$$

$$°\text{Fahrenheit} = \frac{9}{5} \times °\text{Celsius} + 32$$

Simple Interest Formula

$$i = prt$$

where i = interest, p = principal, r = rate, and t = time

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

where $ax^2 + bx + c = 0$, $a \neq 0$, and $b^2 - 4ac \geq 0$

Conversions

1 yard = 3 feet = 36 inches
1 mile = 1,760 yards = 5,280 feet
1 acre = 43,560 square feet
1 hour = 60 minutes
1 minute = 60 seconds

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

1 liter = 1000 milliliters = 1000 cubic centimeters
1 meter = 100 centimeters = 1000 millimeters
1 kilometer = 1000 meters
1 gram = 1000 milligrams
1 kilogram = 1000 grams

1 pound = 16 ounces
1 ton = 2,000 pounds